Instructions

for the

HEATH ZENITH

RS-232 ACCESSORY

Model RTA-1-3

INTRODUCTION

This Accessory will allow you to connect your RT-1 Robot memory to the console of a video terminal or computer for bilateral transfer of digital data. Thus, you can program on a Computer and transfer this information to the Robot memory circuits. If, at some future time, you wish to recall specific programming for modification, the memory will read out its contents to the Computer where you may manipulate it freely before restoring it to the Robot's memory chips.

Federal Communications Commission requirements prescribe certification of personal computers and any interconnected peripherals in Part 15 Subpart J of the rules and regulations. This computing device will meet these requirements when constructed in strict accordance with the instructions in this manual, using only components and materials supplied with the kit or the exact equivalent thereof. You will be instructed to sign and date the enclosed FCC ID label and affix the label to the equipment certifying that you have constructed this equipment inaccordance with the above mentioned instructions. In order to meet legal requirements, be certain to follow the instructions exactly as they are stated in this manual.

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

597-3620

PARTS LIST

Check each part against the following list and the "Parts Pictorial." Return any part that is packed in an individual envelope, with the part number on it, back into its envelope until that part is called for in a step. Do not throw away any packing material until you have accounted for all the parts.

To order a replacement part, always include the PART NUMBER. For ordering information, refer to "Customer Service" inside the rear cover of the RT-1 Robot Manual. For prices, refer to the separate "Heath Parts Price List."

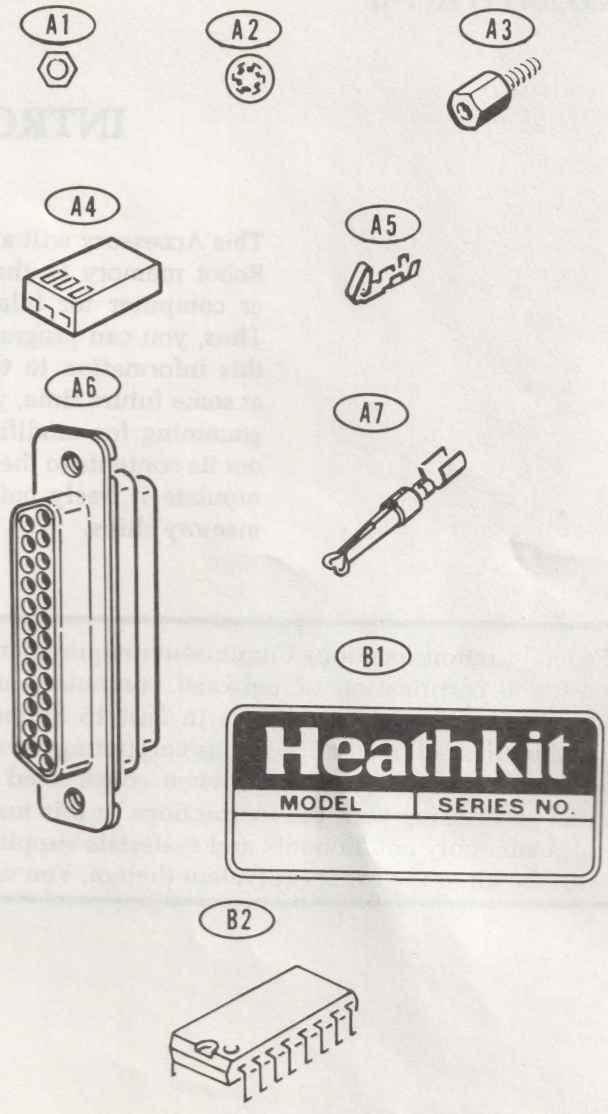
KEY No.	HEATH Part No.	QTY.	DESCRIPTION
HARDWARE-CONNECTORS			
A1	252-15	2	4-40 nut
A2	254-9	2	#4 lockwasher
A3	255-757	2	Threaded spacer
A4	432-865	1	3-hole connector shell
A5	432-866	3	3 spring connectors
A6	432-1028	1	RS-232 connector
A7	432-1031	3	Female pin
OTHER PARTS			
	347-54	12"	3-wire cable
B1		1	Blue and white label
	390-1855-27	1	FCC label

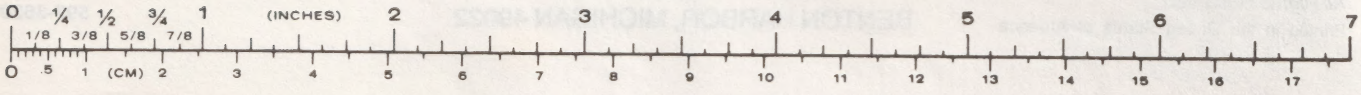
NOTE: Integrated circuits may be marked for identification in any of the following four ways:

1. Part number.
2. Type number. (This refers only to the numbers printed in **bold** type; the letters may different or missing.)
3. Part number and type number.
4. Part number with a type number other than the one listed.

CAUTION: Do not remove an IC from its protective foam pad until you are directed to do so in a step.

B2	443-757	1	**74LS161** IC
B2	443-760	1	MC**14040** IC
B2	443-794	1	SN**75188 (1488)** IC
B2	443-1019	1	MC**6850**P IC
			Solder





ROBOT DISASSEMBLY

NOTE: If you are building your RT-1 Robot at this time, disregard the steps on this Page. Proceed to Page 4 and the "Step-by-Step Assembly."

IMPORTANT: In the following step, if you previously stored any data in the Robot memory that you wish to retain, do not turn off the Robot power. In this manner, your Robot will retain all the stored data, even though you will temporarily remove some of its interconnecting cables.

( ) Turn off the Robot power OR set the Sleep switch to its SLEEP position and, if necessary, disconnect any externally-connected cables, cords, etc., from your unit.

Refer to Pictorial 1-1 (Illustration Booklet, Page 1) for the following steps.

( ) Carefully lift the front and rear body panels from the Robot as shown. Set the panels aside temporarily.

( ) Locate and temporarily remove the four thumbscrews holding the Robot head onto the chassis.

( ) As you lift the Robot head from the chassis, carefully unplug the interconnecting cables from the CPU and the power/sense circuit boards. Set the head assembly aside temporarily.

Refer to Pictorial 1-2 (Illustration Booklet, Page 1) for the following steps.

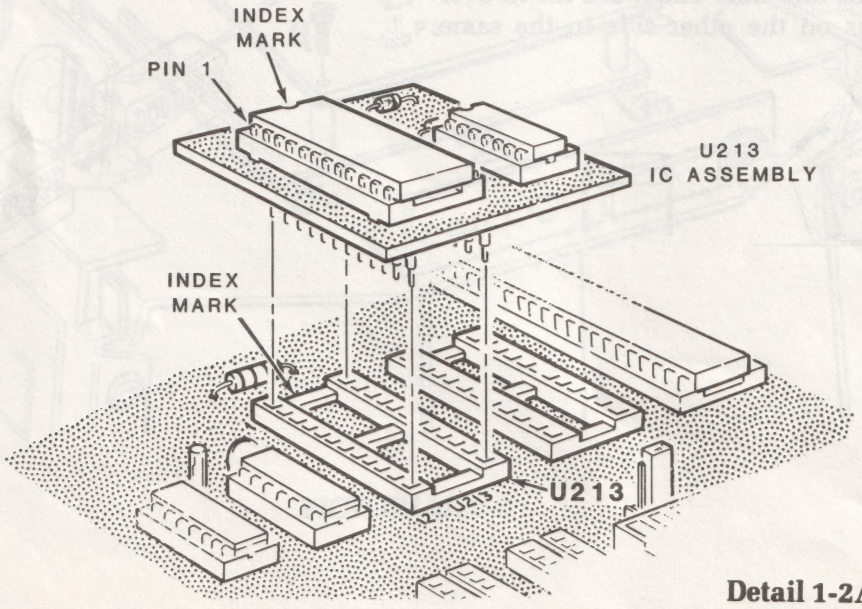
( ) On the power/sense circuit board, lift speaker connector S304 from plug P304.

( ) Remove charger cable connector S307 from circuit board plug P307.

( ) Remove the four screws from the corners of the power/sense circuit board and set them aside temporarily.

( ) Carefully rotate the power/sense circuit board up and to the right to expose the surface of the CPU circuit board as shown.

( ) Refer to Detail 1-2A. If you previously installed a U213 IC assembly on the circuit board (as shown), carefully lift this assembly from U213. Then locate the MC**6850**P IC packed with this kit. Push the pins of this assembly into the protective foam, back to back with the **6850** IC.



Detail 1-2A

STEP-BY-STEP ASSEMBLY

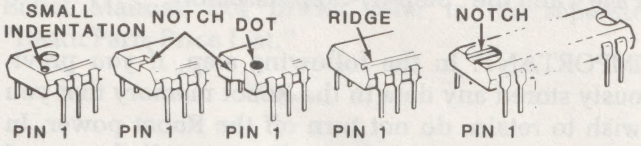
CAUTION: Integrated circuits (ICs) are complex electronic devices that perform many complicated functions in the circuit. However, these devices can be damaged during installation. **Read all of the following information before you install any ICs.**

Once you remove a protected IC from its protective foam packing, DO NOT lay the IC down or let go of it until it is installed in its socket. When you bend the leads of a protected IC, hold the IC in one hand and place your other hand on your work surface before you touch the IC to the work surface. This will equalize the static electricity between the work surface and the IC.

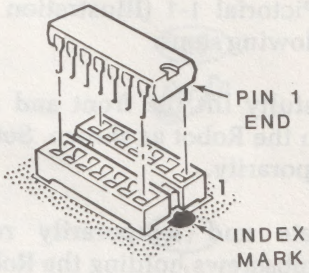
The pins on the ICs are bent out at an angle. DO NOT try to install the IC without first bending the pins, as described below, so they will line up with the holes in the IC socket. To do so may damage the IC pins or the socket, causing intermittent contact.

Before you install an IC, lay it down on its side as shown and very carefully roll it toward the pins to bend the lower pins into line. Then turn the IC over and bend the pins on the other side in the same manner.

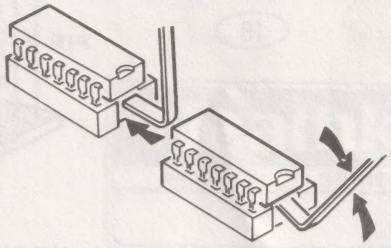
Next, compare the IC to the drawing shown below, and determine which end of the IC is the pin 1 end.



When you install each IC, make sure that the pin 1 end is positioned over the index mark on the circuit board. Also make sure that all of the pins are started into the socket. Then press the IC firmly into the socket. NOTE: An IC pin can become bent under the IC and it will appear as though it is correctly installed in the socket.



If you should have to remove an IC, use an IC lifter or the blade of a small screwdriver to lift and remove it from its socket without bending the IC pins.



Heathkit®

Refer to Pictorial 2-1 (Illustration Booklet, Page 2) for the following steps.

Install the following ICs on the CPU circuit board.

( ) U217: **74LS161** IC (#443-757).

( ) U219: **75188 (1488)** IC (#443-794).

CAUTION: In the next two steps, as you install the static-sensitive ICs, be sure and touch the Robot (metal) chassis with one hand while holding the IC in the other hand to equalize any static electricity.

( ) U218: MC**14040** IC (#443-760).

( ) U216: MC**6850**P IC (#443-1019).

( ) Refer back to Detail 1-2A and, if necessary, reinstall the U213 IC assembly on the CPU circuit board at U213 in the manner shown.

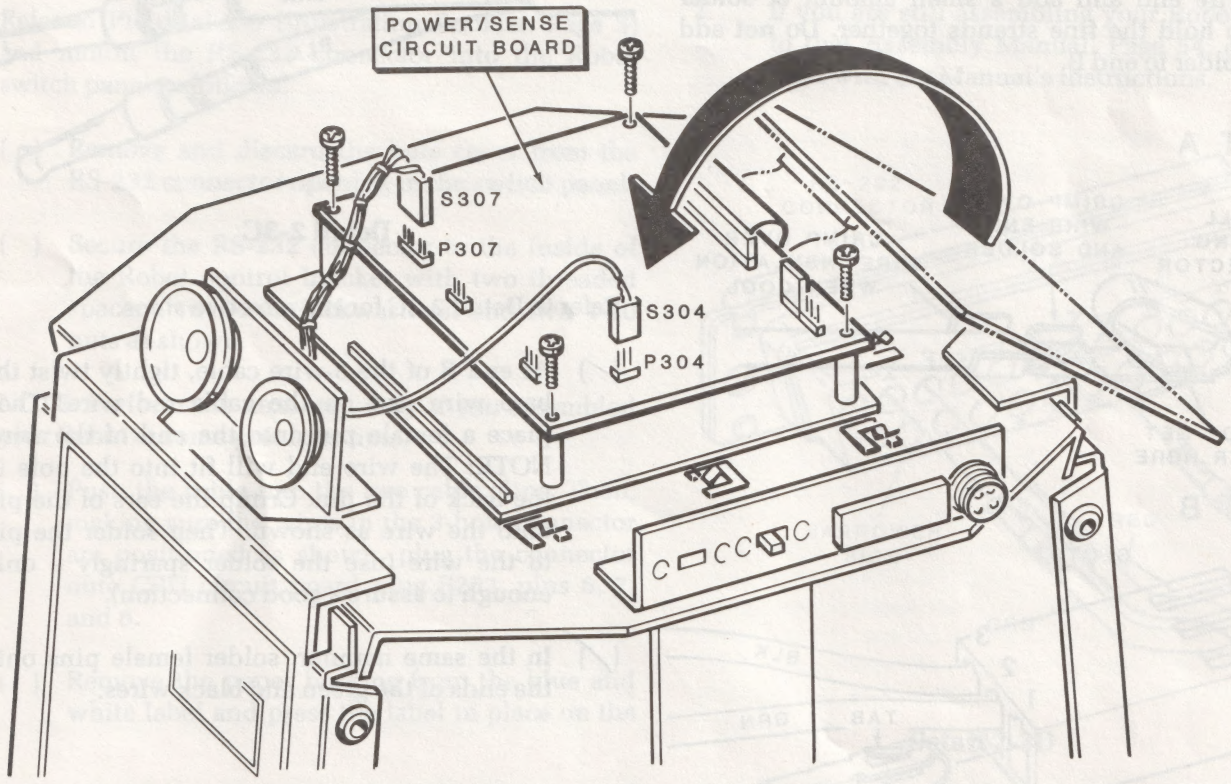
( ) Refer to the inset drawing on Pictorial 2-1 and, also referring to your computer or terminal specifications, set Baud Rate jumper SW201 to the same rate as for the computer or terminal. Note that the baud rates are screened on the CPU board alongside their respective pin-pairs.

Refer to Pictorial 2-2 for the following steps.

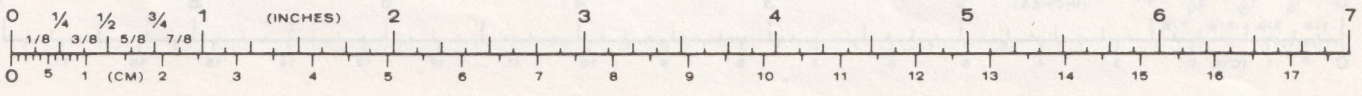
( ) Reposition the power/sense circuit board over the CPU circuit board. Then secure the power/sense board with the four 4-40 × 1/4" screws previously removed.

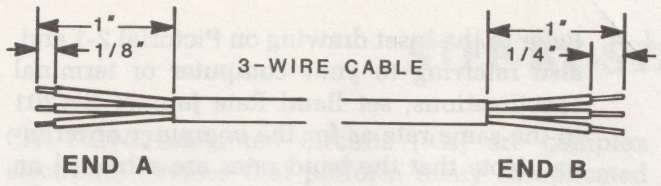
( ) Push 6-hole connector S307 onto plug P307.

( ) Push 3-hole speaker connector S304 onto plug P304.



PICTORIAL 2-2





Detail 2-3A

Refer to Pictorial 2-3 (Illustration Booklet, Page 3) for the following steps.

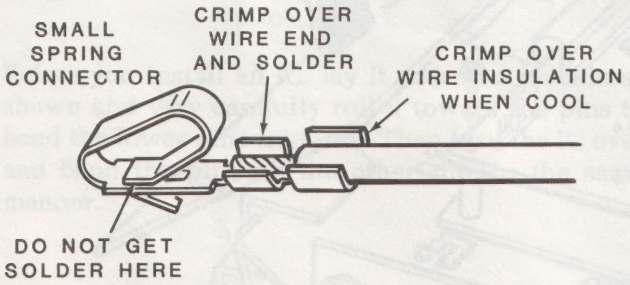
Refer to Detail 2-3A for the next three steps.

( ) Remove 1" of the outer insulation from each end of the 3-wire cable. Take care that you do not cut into the inner wires' insulation.

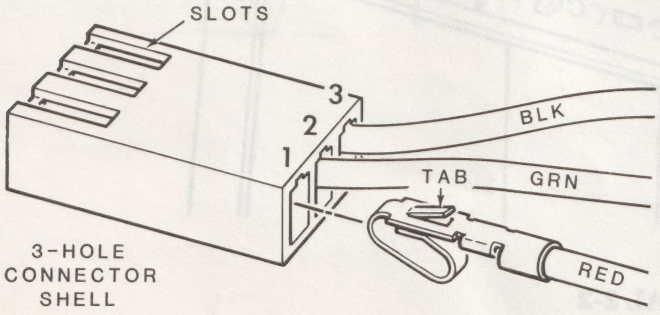
( ) At one end of the cable, remove 1/8" of the insulation from each of the three wires; this will be designated **end A.** Remove 1/4" of insulation from the other wire ends at **end B.**

( ) At end A of the cable, tightly twist each bare wire end and add a small amount of solder to hold the fine strands together. Do **not** add solder to end B.

PART A



PART B

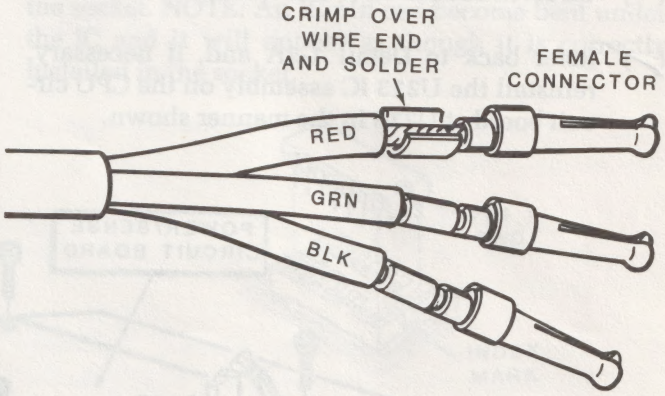


Detail 2-3B

( ) Refer to Part A of Detail 2-3B and crimp and solder a small spring connector on the end of each wire at end A of the cable as shown. Be careful not to get any solder into the spring ends of the connectors.

( ) Refer to Part B of Detail 2-3B and position the 3-hole connector shell with the slots upward as shown. Then, making sure the small tab on the red-wire spring connector is up, push the connector into shell hole 1. Tug on the wire to make sure it is latched in the connector.

( ) In the same manner, install the green wire in connector hole 2 and the black wire in hole 3. Check both wires to be sure they are latched.

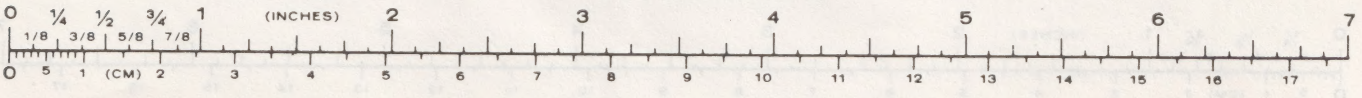


Detail 2-3C

Refer to Detail 2-3C for the next two steps.

( ) At end B of the 3-wire cable, tightly twist the bare wire end on the cable red wire. Then place a female pin onto the end of the wire. NOTE: The wire end will fit into the hole in the back of the pin. Crimp the ears of the pin onto the wire as shown. Then solder the pin to the wire (use the solder sparingly – only enough to assure a good connection).

( ) In the same manner, solder female pins onto the ends of the green and black wires.



Refer to Detail 2-3D for the following steps.

IMPORTANT: Before you install the female pins in the RS-232 connector, study the connector carefully. Note that the hole numbers are embossed on the black insulator side of the connector. Once you install a pin in the connector, you will be unable to remove it to shift it to a different hole.

( ) Position the RS-232 connector on your work area exactly as shown in the Detail. Note that the narrower side of the connector is toward the bottom.

( ) Push the female pin on the end of the green wire into connector **hole 2.** Tug on the wire to make sure the pin is securely latched.

( ) In the same manner, install the pin on the red wire into connector **hole 3.**

( ) In the same manner, install the pin on the black wire into connector **hole 7.**

Refer to Pictorial 2-3 (Illustration Booklet, Page 3) and mount the RS-232 connector into the Robot switch panel as follows:

( ) Remove and discard the hole cover from the RS-232 connector opening in the switch panel.

( ) Secure the RS-232 connector to the inside of the Robot control bracket with two threaded spacers, two 4-40 lockwashers, and two 4-40 nuts as shown.

NOTE: Perform the next step only if you assembled your Robot at some previous time.

( ) Push the cable into the two cable clips. Then, making sure the wires in the 3-hole connector are positioned as shown, plug the connector onto CPU circuit board plug P203, pins 6, 7, and 8.

( ) Remove the paper backing from the blue and white label and press the label in place on the rear subpanel as shown. NOTE: Be sure to always refer to the Model and Series numbers on the blue and white label in any correspondence you have with the Heath Company about this Accessory.

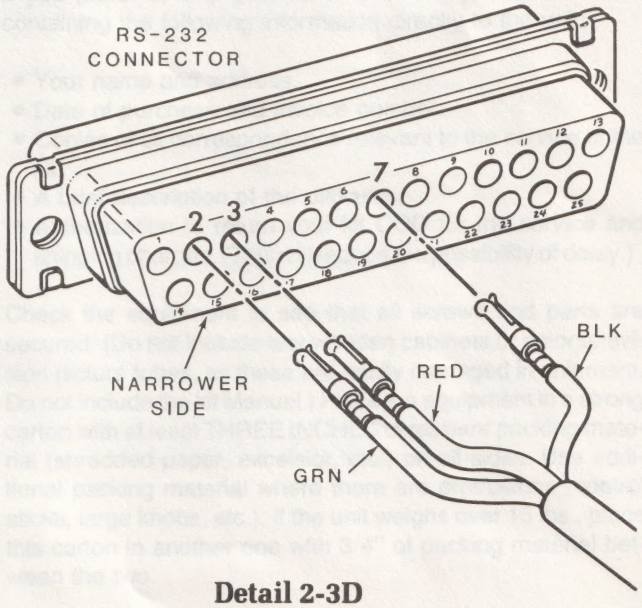
( ) Sign and date the FCC label in the space provided.

( ) Remove the paper backing from the FCC label and press the label **over** the "Verification" label on the rear subpanel. NOTE: If you have not installed the "Verification" label, you should discard it from your RT-1 Robot kit.

NOTES:

1. This completes the installation of your RS-232 Accessory. If you have purchased any other Accessory items for your Robot, you may wish to install them at this time before you proceed to "Final Assembly."

2. If you are still assembling your Robot, return to that Assembly Manual, Page 54, and proceed with the Manual's instructions.



Detail 2-3D

FINAL ASSEMBLY

Refer to Pictorial 1-1 (Illustration Booklet, Page 1) for the following steps.

Carefully reinstall the cable sockets onto the following circuit board plugs:

( ) S205 onto CPU circuit board plug P205.

( ) S305 onto power/sense circuit board plug P305.

( ) S306 onto power/sense circuit board plug S306.

( ) S303 onto power/sense circuit board plug P303.

( ) Position the Robot head down onto the chassis so the mounting bolts enter the chassis holes as shown.

( ) Secure the Robot head to the chassis with the four thumbscrews previously removed.

( ) Reinstall the front and back Robot body panels.

This completes the installation of your RS-232 Accessory. Refer to your "Programmer's Guide" for operation information.

NOTE: Be sure to place your Robot on the floor before you again turn on its power. Some of its self-checks will move the Robot slightly, and it might fall from your work area.

CUSTOMER SERVICE

REPLACEMENT PARTS

Please provide complete information when you request replacements from either the factory or Heath Electronic Centers. Be certain to include the **HEATH** part number exactly as it appears in the parts list.

ORDERING FROM THE FACTORY

Print all of the information requested on the parts order form furnished with this product and mail it to Heath. For telephone orders (parts only) dial 616 982-3571. If you are unable to locate an order form, write us a letter or card including:

- Heath part number.
- Model number.
- Date of purchase.
- Location purchased or invoice number.
- Nature of the defect.
- Your payment or authorization for COD shipment of parts not covered by warranty.

Mail letters to: Heath Company
Benton Harbor
MI 49022
Attn: Parts Replacement

Retain original parts until you receive replacements. Parts that should be returned to the factory will be listed on your packing slip.

OBTAINING REPLACEMENTS FROM HEATH ELECTRONIC CENTERS

For your convenience, "over the counter" replacement parts are available from the Heath Electronic Centers listed in your catalog. Be sure to bring in the original part and purchase invoice when you request a warranty replacement from a Heath Electronic Center.

TECHNICAL CONSULTATION

Need help with your kit? — Self-Service? — Construction? — Operation? — Call or write for assistance. you'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

Please do not send parts for testing, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek — please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase and invoice number.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit COD for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment. Do not include the kit Manual.) Place the equipment in a strong carton with at least THREE INCHES of *resilient* packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company
Service Department
Benton Harbor, Michigan 49022

YOUR HEATHKIT 90-DAY LIMITED WARRANTY

Consumer Protection Plan for Heathkit Consumer Products

Welcome to the Heath family. We believe you will enjoy assembling your kit and will be pleased with its performance. Please read this Consumer Protection Plan carefully. It is a "LIMITED WARRANTY" as defined in the U.S. Consumer Product Warranty and Federal Trade Commission Improvement Act. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Heath's Responsibility

PARTS — Replacements for factory defective parts will be supplied free for 90 days from date of purchase. Replacement parts are warranted for the remaining portion of the original warranty period. You can obtain warranty parts direct from Heath Company by writing or telephoning us at (616) 982-3571. And we will pay shipping charges to get those parts to you . . . anywhere in the world.

SERVICE LABOR — For a period of 90 days from the date of purchase, any malfunction caused by defective parts or error in design will be corrected at no charge to you. You must deliver the unit at your expense to the Heath factory, any Heathkit Electronic Center (units of Veritechnology Electronics Corporation), or any of our authorized overseas distributors.

TECHNICAL CONSULTATION — You will receive free consultation on any problem you might encounter in the assembly or use of your Heathkit product. Just drop us a line or give us a call. Sorry, we cannot accept collect calls.

NOT COVERED — The correction of assembly errors, adjustments, calibration, and damage due to misuse, abuse, or negligence are not covered by the warranty. Use of corrosive solder and/or the unauthorized modification of the product or of any furnished component will void this warranty in its entirety. This warranty does not include reimbursement for inconvenience, loss of use, customer assembly, set-up time, or unauthorized service.

This warranty covers only Heath products and is not extended to other equipment or components that a customer uses in conjunction with our products.

SUCH REPAIR AND REPLACMENT SHALL BE THE SOLE REMEDY OF THE CUSTOMER AND THERE SHALL BE NO LIABILITY ON THE PART OF HEATH FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO ANY LOSS OF BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Owner's Responsibility

EFFECTIVE WARRANTY DATE — Warranty begins on the date of first consumer purchase. You must supply a copy of your proof of purchase when you request warranty service or parts.

ASSEMBLY — Before seeking warranty service, you should complete the assembly by carefully following the manual instructions. Heathkit service agencies cannot complete assembly and adjustments that are customer's responsibility.

ACCESSORY EQUIPMENT — Performance malfunctions involving other non-Heath accessory equipment, (antennas, audio components, computer peripherals and software, etc.) are not covered by this warranty and are the owner's responsibility.

SHIPPING UNITS — Follow the packing instructions published in the assembly manuals. Damage due to inadequate packing cannot be repaired under warranty.

If you are not satisfied with our service (warranty or otherwise) or our products, write directly to our Director of Customer Service, Heath Company, Benton Harbor MI 49022. He will make certain your problems receive immediate, personal attention.

HEATH COMPANY • BENTON HARBOR, MICHIGAN 49022
TLX 72-9421

IMPORTANT NOTICE

Please make the following changes in your Accessory Instructions before you begin to install your kit.

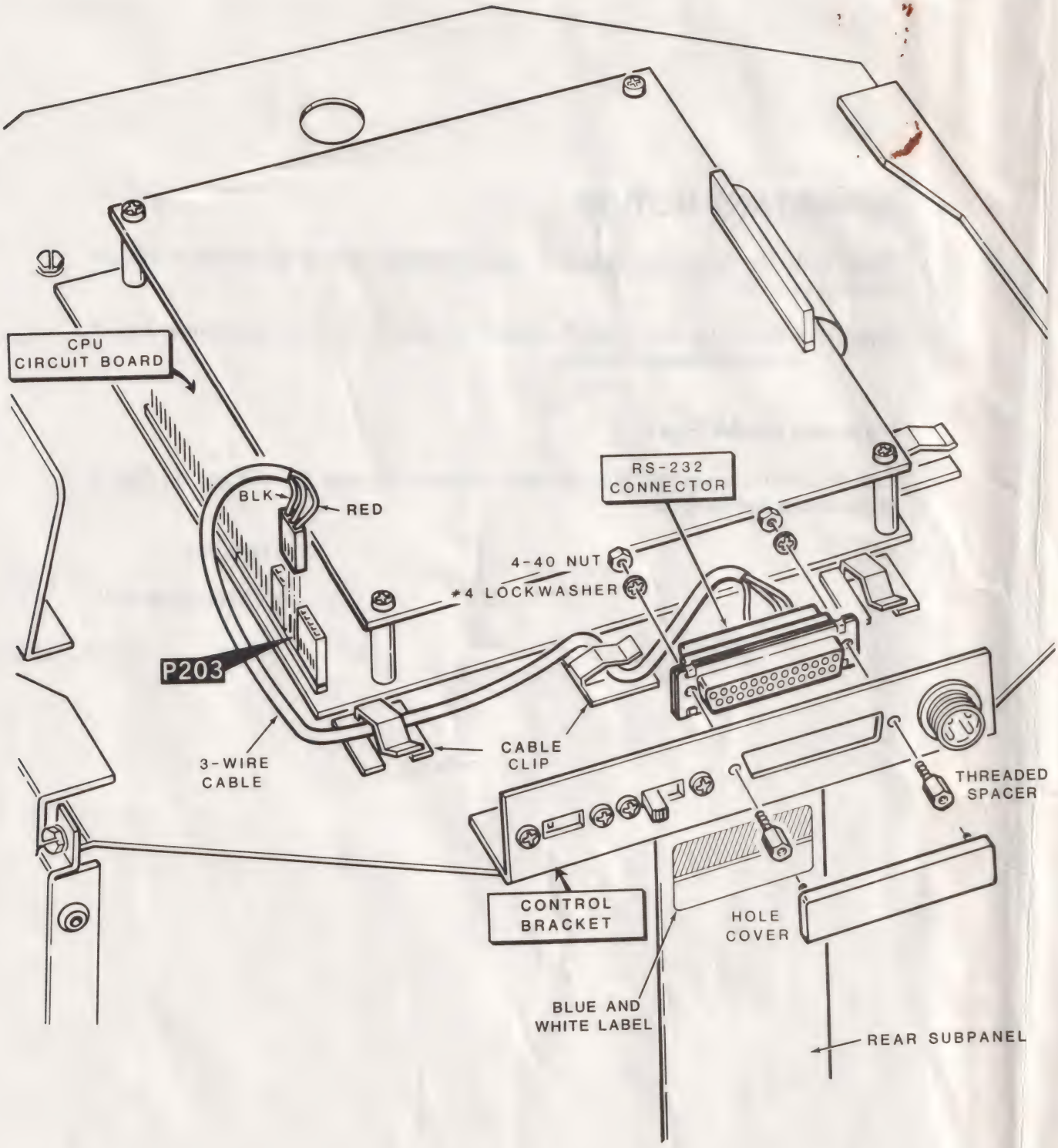
Page 7 — Remove the new Page 7 attached to this Notice and tape it over Page 7 in your Instruction Booklet.

Illustration Booklet, Page 3.

Turn this Notice over and tape the new Pictorial 2-3 over the old one on Page 3 of the Illustration Booklet.

Thank you,

HEATH COMPANY



PICTORIAL 2-3

Heathkit®

Refer to Detail 2-3D for the following steps.

IMPORTANT: Before you install the female pins in the RS-232 connector, study the connector carefully. Note that the hole numbers are embossed on the black insulator side of the connector. Once you install a pin in the connector, you will be unable to remove it to shift it to a different hole.

( ) Position the RS-232 connector on your work area exactly as shown in the Detail. Note that the narrower side of the connector is toward the bottom.

( ) Push the female pin on the end of the green wire into connector **hole 2.** Tug on the wire to make sure the pin is securely latched.

( ) In the same manner, install the pin on the red wire into connector **hole 3.**

( ) In the same manner, install the pin on the black wire into connector **hole 7.**

Refer to Pictorial 2-3 (Illustration Booklet, Page 3) and mount the RS-232 connector into the Robot switch panel as follows:

( ) Remove and discard the hole cover from the RS-232 connector opening in the switch panel.

( ) Secure the RS-232 connector to the inside of the Robot control bracket with two threaded spacers, two 4-40 lockwashers, and two 4-40 nuts as shown.

NOTE: Perform the next step only if you assembled your Robot at some previous time.

( ) Push the cable into the two cable clips. Then, making sure the wires in the 3-hole connector are positioned as shown, plug the connector onto CPU circuit board plug P203, pins 6, 7, and 8.

NOTE: If you have not installed the "Verification" label, discard it from your RT-1 Robot kit. If the label is installed, proceed to cover it as directed in the next step.

( ) Remove the paper backing from the blue and white label and press the label in place over the top of the "Verification" label on the rear subpanel as shown. NOTE: Be sure to always refer to the Model and Series numbers on the blue and white label in any correspondence you have with the Heath Company about this Accessory.

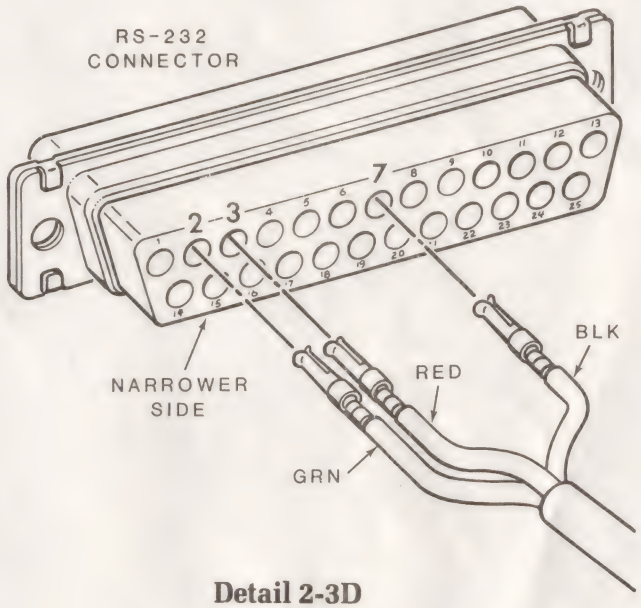
( ) Sign and date the FCC label in the space provided.

( ) Remove the paper backing from the FCC label and press the label on the bottom of the rear subpanel.

NOTES:

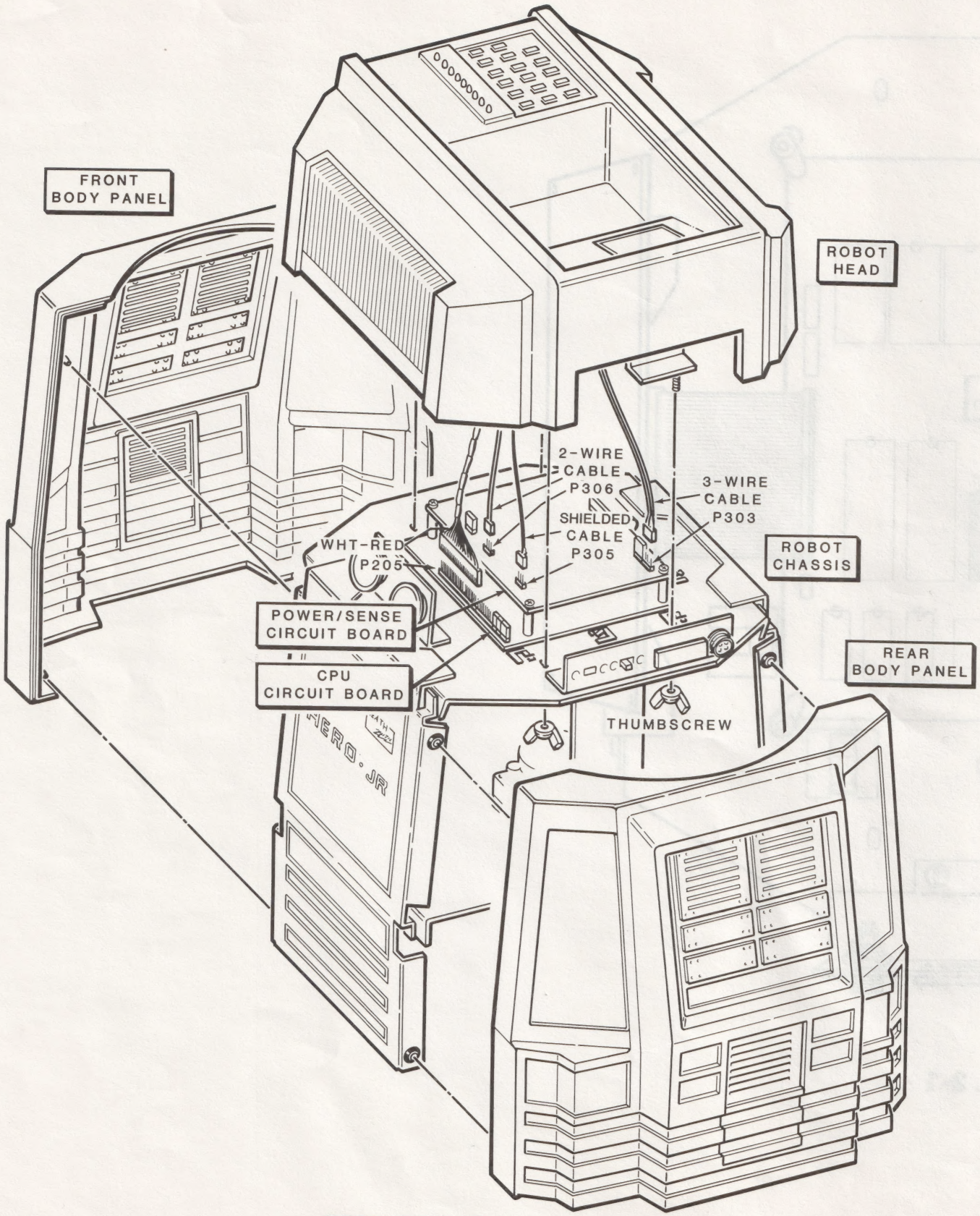
1. This completes the installation of your RS-232 Accessory. If you have purchased any other Accessory items for your Robot, you may wish to install them at this time before you proceed to "Final Assembly."

2. If you are still assembling your Robot, return to that Assembly Manual, Page 54, and proceed with the Manual's instructions.



Detail 2-3D

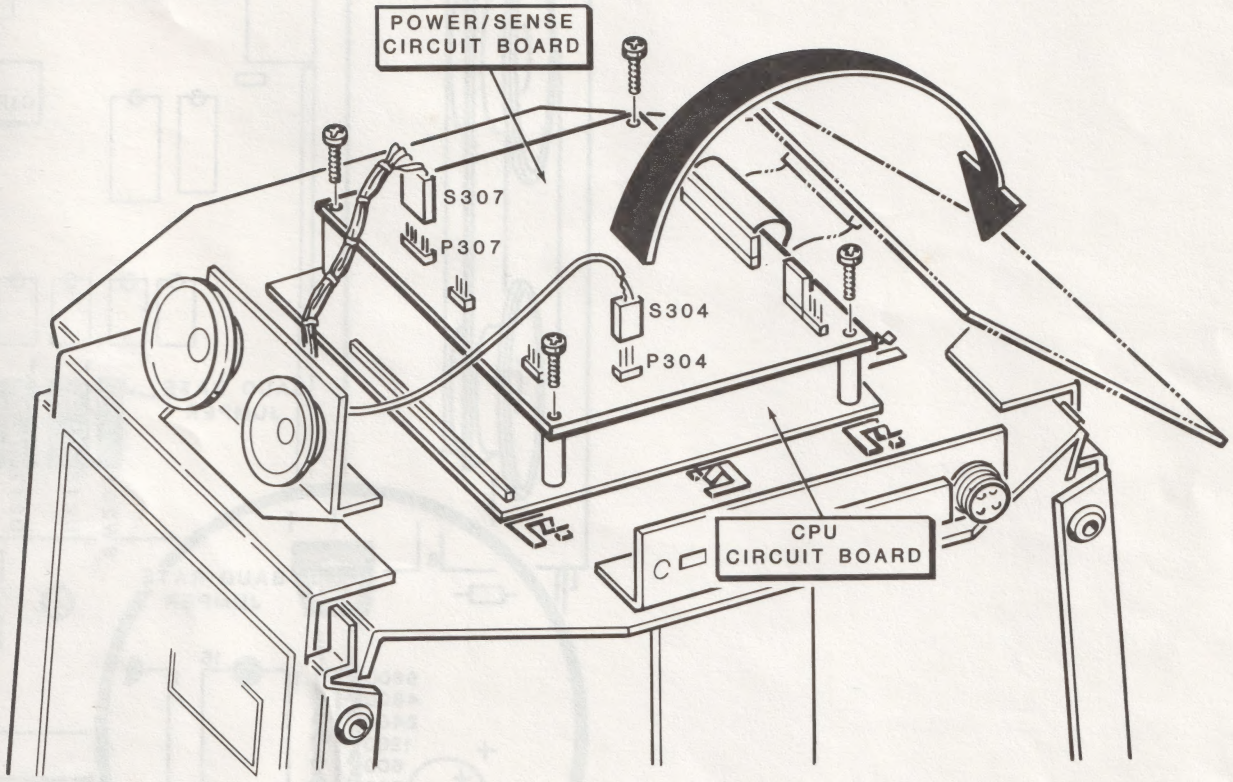
ILLUSTRATIO



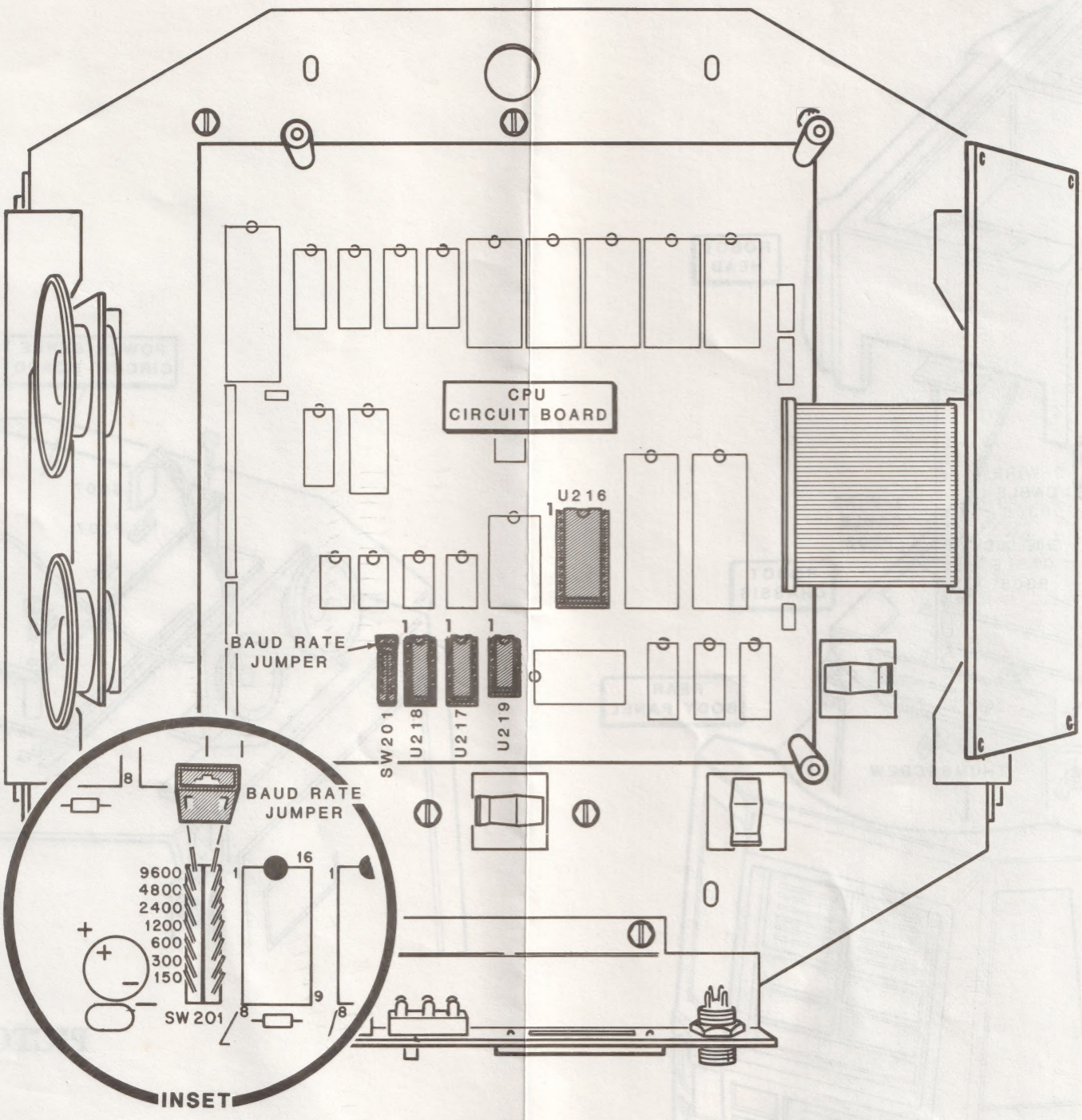
PICTORIAL 1-1

ON BOOKLET

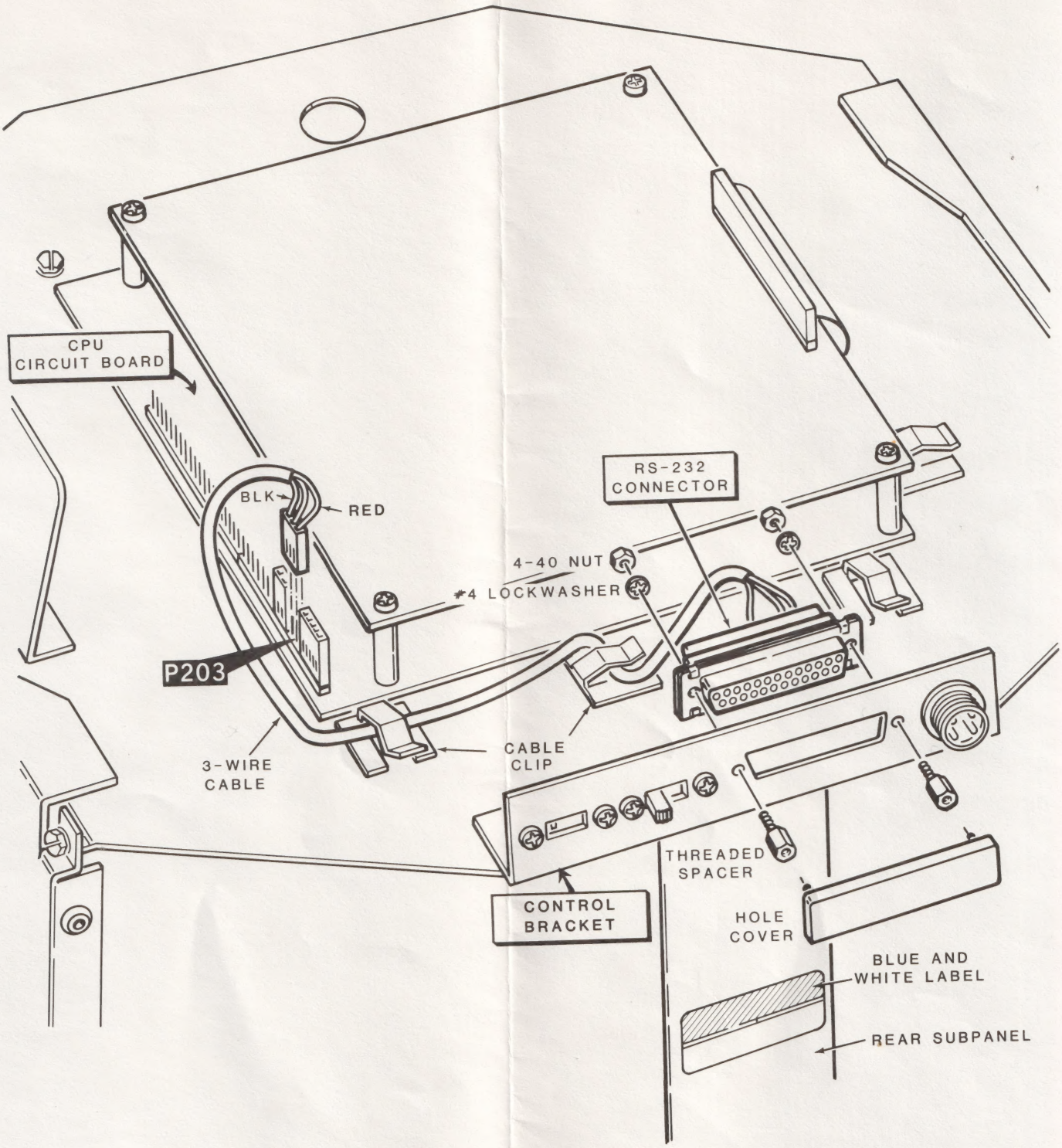
Part of 597-3620



PICTORIAL 1-2



PICTORIAL 2-1



PICTORIAL 2-3